(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organisation International Bureau



(43) International Publication Date 16 June 2005 (16.06.2005)

(10) International Publication Number: WO 2005/054403 A1

(51) International Patent Classification7: H01L 51/30, H05B 33/14, C07F 15/00 C09K 11/06,

(21) International Application Number:

PCT/EP2004/013312

(22) International Filing Date:

24 November 2004 (24.11.2004)

(25) Filing Language:

German

(26) Publication Language:

German

(30) Priority Data:

103 57 315.1

5 December 2003 (05.12.2003) DE

- (71) Applicant (for all designated States except US): COVION ORGANIC SEMICONDUCTORS GMBH [DE/DE]; Industriepark Höchst, F 821, 65926 Frankfurt am Main (DE).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): VESTWEBER, Horst [DE/DE]; Denkmalstrasse 6, 34830 Gilserberg-Winterscheid (DE). GERHARD, Anja [DE/DE]; Humboldtstrasse 29, 97209 Veitshöchheim (DE). STÖSSEL, Philipp [DE/DE]; Hortensienring 17, 65929 Frankfurt (DE).
- (74) Attorneys: DÖRR, Klaus etc.; Industriepark Höchst, F 821, 65926 Frankfurt am Main (DE).

(81) Designated states (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated states (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

Inventor declaration (Rule 4.17 clause iv) for US only

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ORGANIC ELECTROLUMINESCENT ELEMENT

(57) Abstract: The present invention relates to the improvement of phosphorescent organic electroluminescent devices by using materials of the formulae (1) to (4) according to scheme 1 in the hole-blocking layer.